

What Is Claimed Is:

1. A sensor element for a sensor for determining the concentration of a gas component in a gas mixture, in particular the oxygen concentration in the exhaust gas of internal combustion engines, having two electrodes (12, 13) which, together with a solid electrolyte, form a pump cell for the gas component, and of which a first electrode (12) is exposed to the gas mixture via a porous protective layer, and having a reference electrode (17) which is situated on the solid electrolyte, is exposed to a reference gas and, with a reference electrode and the solid electrolyte, forms a concentration cell or a Nernst cell, wherein the electrode surface of the second electrode (13) facing away from the solid electrolyte is coated with a finely porous diffusion layer (19) which is directly exposed to the gas mixture, and the second electrode (13) is used as the reference electrode of the Nernst cell.
2. The sensor element as recited in Claim 1, wherein the porous protective layer is designed as a coarsely porous diffusion layer (18), and the reference electrode of the Nernst cell is formed by either the first or the second electrode (12, 13).
3. The sensor element as recited in Claim 1 or 2, wherein the electrodes (12, 13) are situated on opposite sides of a solid electrolyte body (11).
4. The sensor element as recited in Claim 3, wherein the solid electrolyte body (11) is composed of two solid electrolyte sheets (111, 112), an electrode (12, 13) having a diffusion layer (18, 19) is situated on each solid electrolyte sheet (111, 112), and, between their surfaces facing away from the electrodes (12, 13),

the two solid electrolyte sheets (111, 112) enclose an insulation layer (14) having an integrated electric resistance heater (15), and are interconnected by this insulation layer and a solid electrolyte frame (113) enclosing the insulation layer (14).

5. The sensor element as recited in Claim 4, wherein a solid electrolyte web (114) passing through the insulation layer (14) is formed between the two solid electrolyte sheets (111, 112).
6. The sensor element as recited in Claim 1 or 2, wherein the two electrodes (12, 13) coated with their particular diffusion layers (18, 19) are situated on opposite sides of a first solid electrolyte layer (221), the first solid electrolyte layer (221) is positioned on a second solid electrolyte layer (213) in such a way that a clearance (23) remains between the solid electrolyte layer (213) and the diffusion layer (19) facing it, and the clearance (23) is exposed to the gas mixture via a gas supply orifice (24) passing through the first solid electrolyte layer (211).
7. The sensor element as recited in Claim 6, wherein the first solid electrolyte layer (211) is supported by radial webs (25) on the second solid electrolyte layer (213) in the area of the clearance (23).
8. The sensor element as recited in Claim 7, wherein the radial webs (25) are made of a solid electrolyte.
9. The sensor element as recited in one of Claims 1 through 8, wherein at least the finely porous diffusion layer (19) is made up of several superposed diffusion layers of different porosities.